

REMARKS

In the subject Office Action, claims 1, 2 and 3 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,852,054 to Mastandrea. In addition, claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Mastandrea in view of U.S. Patent No. 6,234,030 to Butler. In response, independent claim 1 has been amended to more clearly recite the method of the invention. In addition, claims 7 and 11 have been added by the present amendment. Applicants respectfully submit that independent claims 1, 7 and 11, and the claims that depend therefrom, are patentable over the cited art.

The method of the invention permits the volume of cryogenic liquid in a tank or vessel to be determined without the use of calibration tables or charts. Such charts are awkward to use and separate charts are required for different combinations of factors such as the type of cryogenic liquid, tank orientation and dimensions and expected pressure of the cryogenic liquid. The method of the present invention permits efficient off-site monitoring of the cryogenic liquid volume.

The independent claims of the application, claims 1, 7 and 11, recite a method of determining the volume of a cryogenic liquid (such as a liquefied gas) in a tank. In contrast, the focus of Mastandrea is leak detection for a tank that holds non-cryogenic liquids such as petroleum products, water or chemicals. There is no mention of cryogenic liquids in Mastandrea at all. Volumetric determinations for cryogenic liquids present unique concerns that do not exist for non-cryogenic liquids. As a result, Mastandrea fails to teach a method for determining the volume of a cryogenic liquid in a tank.

Newly added claim 7 of the application recites the steps of storing a lookup table of conversion coefficients and calculating an estimated average pressure using the table of conversion coefficients and a measured pressure of the tank head space. Amended claim 1 and newly added independent claim 11 each recite the step of entering a stratification coefficient (instead of storing and accessing a table of conversion coefficients) that is used, along with the measured pressure of the tank head space, to calculate the average pressure.

The Mastandrea patent does not disclose a table of calibration constants that may be used to calculate an estimated average pressure based upon the head space pressure (as recited by claim 7). The Mastandrea patent also fails to disclose entering a stratification coefficient (as recited by claims 1 and 11). As a result, Applicants respectfully submit that there is no way that Mastandrea can teach any method that uses such a table or input, let alone the specific steps of calculating an estimated average pressure using such a table or input along with a measured head space pressure, as recited by the independent claims of the application.

Furthermore, independent claims 1, 7 and 11 each recite the step of using the estimated average pressure thus calculated to read a liquid density from a lookup table. Claims 1, 7 and 11 also each recite the step of using the density thus obtained, along with a measured differential pressure (between the tank head space and liquid space), to calculate volume of cryogenic liquid in the tank.

Mastandrea does not disclose a table of density values. As a result, Applicants respectfully submit that there is no way that Mastandrea can teach any method that uses such tables. Mastandra also does not suggest or teach a volume calculation method that uses a liquid density and a measured differential pressure as recited by claims 1, 7 and 11 of the application.

Applicants therefore respectfully submit that independent claims 1, 7 and 11, and thus the claims which are dependent thereon, are patentable over Mastandrea.

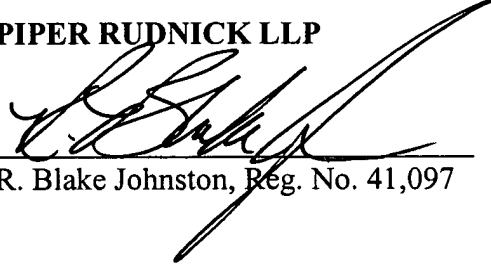
In addition, newly added claim 6 recites that the that the stratification coefficient of claim 1 is determined by tank height, orientation, operating pressure, refill level and refill frequency to correct saturation pressure for stratification in a tank. Similarly, newly added claim 10 recites that the conversion coefficients of claim 7 are stratification constants that are determined by tank height, orientation, operating pressure, refill level and refill frequency to correct saturation pressure for stratification in a tank. Such stratification coefficients or constants, and thus their use, are not disclosed in Mastandrea. As a result, claims 6 and 10 are further distinguishable from Mastandrea.

Responsive to the Examiner's request, Applicants affirm the election of group I, claims 1-4.

In view of the foregoing amendments and remarks, it is believed that the application is in condition for allowance and such action is respectfully requested. If the Examiner believes that a telephone conference would advance the prosecution of the case, it is requested that the undersigned attorney be telephoned for that purpose.

Respectfully submitted,

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Dated: 11-17-03

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